

Stacey A. Archfield

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EDUCATION

Ph.D., Civil and Environmental Engineering, Tufts University, 2009
M.S., Geosystems, Massachusetts Institute of Technology, 2001
B.S., Geology (Minor in Mathematics), Northeastern University, 1999

GENERAL RESEARCH INTERESTS

Statistics and stochastic hydrology; surface water and catchment hydrology; water resources management

RESEARCH EXPERIENCE

U.S. Geological Survey, Massachusetts-Rhode Island Water Science Center
Research Hydrologist, 2008-Present
Hydrologist (Project Chief), 2004-2008
Hydrologist, 1998-2004
Research Assistant, Tufts University, Department of Civil and Environmental Engineering, 2003-2009
Research Assistant, Massachusetts Institute of Technology, Earth Resources Laboratory, 2001
Research Associate, Harvard-Smithsonian Center for Astrophysics, Space Geodesy Group, 1999

ADVISING AND TEACHING EXPERIENCE

Graduate students advised

Committee member for William Farmer, M.S. candidate, "Development of Gridded/Catchment Monthly Streamflow Time Series for the United States, South Africa and the Nile River Basin," Department of Civil and Environmental Engineering, *Tufts University*, May 2010-Present.
Committee member for William Asquith, Ph.D. candidate, "Univariate Distributional Analysis with L-moment Statistics using R," Department of Civil and Environmental Engineering, *Texas Tech University*, Graduated: February 2011.
Committee member for David Roman, M.S. candidate, "Multivariate Models of Watershed Suspended Sediment Loads for the Eastern United States," Department of Civil and Environmental Engineering, *Tufts University*, Graduated: June 2010.

Guest lectureships

Department of Civil and Environmental Engineering, Worcester Polytechnic Institute, Course CE 574 - Water Resources Management, November 2009.

Other teaching and advising experience

Manage and advise Northeastern University undergraduate cooperative-education students employed at the U.S. Geological Survey, 2008-Present
Mathematics tutor, Office of Student-Athlete Support Services, Northeastern University, September 1999-June 1999, *Sole mathematics tutor for student athletes; provided weekly tutoring sessions in*

undergraduate courses including algebra, beginning and advanced calculus (Calculus Levels I through IV) and differential equations.

HONORS AND AWARDS

Archfield and Vogel [2010] paper was selected by the American Geophysical Union journal editors to be featured as a Research Highlight. *Only 4 papers are selected bi-weekly from the 18 journals that are published by the American Geophysical Union.*

(<http://www.agu.org/journals/eo/eo1106/2011EO060009.pdf>) (2011).

Hirsch, Moyer and Archfield [2010] paper was selected as one of four finalists for the William R. Boggess Award, *This award is given to a paper published in the Journal of the American Water Resources Association that best describes, delineates, or analyzes a major problem or aspect of water resources from either a theoretical, applied, or philosophical standpoint.*

(<http://awramedia.org/jawra/2011/05/11/2011-boggess-finalists/>) (2011).

U.S. Geological Survey Exceptional Performance Rating, *Highest performance rating achievable* (2010; 2009; 2008; 2007; 2006).

Selected to deliver the 2010 U.S. Geological Survey Chief Hydrologist Seminar, *Only one researcher from the U.S. Geological Survey is selected each year to deliver this seminar* (2010).

American Geophysical Union Outstanding Student Paper Award (2009).

Tufts University Civil & Environmental Engineering Department Littleton Award, *Professional Promise Award* (2009).

U.S. Geological Survey Special Thanks for Achieving Results (STAR) awards, *Recognition of contributions to various studies* (2002; 2001; 1999).

Northeastern University Commencement Speaker, *Selected to deliver the student commencement address* (1999).

Northeastern University Wendy Breen Kline Award, *Professional Promise Award* (1999).

Northeastern University Gregory Jarvis Scholarship Recipient, *Most Outstanding Senior for Academics and Student Activities* (1999).

Northeastern University Student Body President, *First geology major to be elected to this position* (1997-1998).

INVITED PRESENTATIONS AND SEMINARS

Archfield, S.A., 2011, "Estimation of daily streamflow time series at ungaged basins using the map correlation method," *8th Annual Water Resources Conference*, Amherst, MA, April 2011.

Archfield, S.A., 2010, "New tools to estimate water availability at ungaged sites," *U.S. Geological Survey Chief Hydrologist Seminar*, National Center, Reston, VA, April 2010 (*Only one researcher from the U.S. Geological Survey is selected each year to deliver this seminar*).

Archfield, S.A., 2010, "Balancing water use and ecological-flow needs: A decision-support tool to interactively assess water availability at ungaged sites in Massachusetts," *U.S. Geological Survey Water Use Workshop*, Baltimore, MD, April 2010.

Archfield, S.A., 2010, "Estimation of daily streamflow time series at ungauged catchments using map correlation," *Department of Civil and Environmental Engineering, Pennsylvania State University*, College Park, PA, April 2010.

Archfield, S.A., R.M. Vogel, T. Wagener, and R. Singh, 2009, "Rainfall-runoff model calibration at an ungauged catchment using the map-correlation method," *American Geophysical Union Fall Meeting 2009*, San Francisco, CA, December 2009 (*Received an American Geophysical Union Outstanding Student Paper Award for this presentation*).

Archfield, S.A., R.M. Vogel, P.A. Steeves, S.B. Brandt, P.K. Weiskel, and S.P. Garabedian, 2009, "A decision-support tool to assess water availability at ungaged sites in Massachusetts," *Northeast*

Association of Fish and Wildlife Agencies 65th Annual Northeast Fish and Wildlife Conference, Lancaster, Pennsylvania, April 2009.

Archfield, S.A., 2009, “Estimating water availability at ungaged sites,” *U.S. Geological Survey National Research Program Water Resources Discipline Research Seminar*, Reston, Virginia, January 2009.

Archfield, S.A., 2008, “The Massachusetts Sustainable-Yield Estimator: A decision-support tool to estimate continuous daily streamflow at ungaged locations in Massachusetts,” *Joint meeting of the U.S. Geological Survey and The Nature Conservancy, Regional-Scale Streamflow-Ecology Relationships*, Seattle, Washington, April 2008.

Archfield, S.A., 2008, “The Massachusetts Firm-Yield Estimator: A decision-support system to determine firm yields for drinking-water-supply reservoirs in Massachusetts,” *Department of Natural Resources Management and Engineering Seminar Series, University of Connecticut*, February 2008.

Archfield, S.A., 2007, “Construction of a Complete Hydrograph at Ungaged Sites,” *Special Session on Low-Flow Hydrology, U.S. Geological Survey National Surface Water Conference and Hydroacoustics Workshop*, St. Louis, Missouri, April 2007.

PUBLICATIONS

Book chapters in preparation

Co-author, “Statistical runoff simulation methods.” In: Runoff prediction in ungauged basins – a synthesis and benchmark assessment, Bloeschl, G., H. Savenije, M. Sivapalan, and T. Wagener, (Eds.). Cambridge University Press, UK. (*Author order for chapter still to be determined*).

Co-author, “Case studies,” In: Runoff prediction in ungauged basins – A synthesis, Bloeschl, G., M. Sivapalan, H. Savenije, , and T. Wagener, (Eds.). Cambridge University Press, UK. (*Author order for chapter still to be determined*).

Published journal articles

Archfield, S. A., and R.M. Vogel, 2010, Map correlation method: Selection of a reference streamgage to estimate daily streamflow at ungaged catchments, *Water Resources Research*, 46, W10513, doi:10.1029/2009WR008481.

Hirsch, R.M., D. Moyer, and **S.A. Archfield**, 2010, Analysis of long-term surface water quality data using Weighted Regressions on Time, Discharge, and Season (WRTDS): motivations, method, and application to Chesapeake Bay River Input Monitoring data, *Journal of the American Water Resources Association*, 46(5):857-880. DOI: 10.1111/j.1752-1688.2010.00482.x.

Vogel, R.M., J. Sieber, **S.A. Archfield**, M.P. Smith, C.D. Apse and A. Huber-Lee, 2007, Relations among storage, yield and instream flow, *Water Resources Research*, 43, doi:10.1029/2006WR005226, 2007.

Refereed journal manuscripts under review

Archfield, S.A., R. Singh, T. Wagener, and R.M. Vogel, *under revision*, Using correlation to understand hydrologic similarity between catchments as a basis for parameter transfer, *Water Resources Research*.

Medalie, L., R.M. Hirsch, and **S.A. Archfield**, *under revision*, Trends in nutrient concentrations and yields in Lake Champlain tributaries 1990-2008: an evaluation using new statistical methods, *Journal of Great Lakes Research*.

Refereed journal manuscripts in preparation (*to be submitted in less than six months*)

Archfield, S.A., P.A. Steeves, J.D. Guthrie, and K. Ries, A decision support tool to estimate unregulated, daily streamflow at ungauged sites in the Connecticut River Basin, northeastern United States, *to be*

submitted to Environmental Modeling and Software.

Archfield, S.A., R.M. Vogel, and N. Matalas, The behavior of stochastic averages, *to be submitted to Water Resources Research*.

Archfield, S.A. and R.M. Vogel, The distribution of daily streamflow, *to be submitted to Water Resources Research*.

Archfield, S.A. and R.M. Vogel, Reliability of reservoir firm yield determined from the historical drought of record, *to be submitted to the Journal of Hydrologic Engineering*.

Conference proceedings, peer-reviewed U.S. Geological Survey reports, and other publications

Kiang, J.E., D. Stewart, **S.A. Archfield**, and K. Eng, *in review*, A National Streamflow Network Gap Analysis: *U.S. Geological Survey Scientific Investigations Report*.

Levin, S.L., **S.A. Archfield**, and A.J. Massey, 2011, Refinement and Further Evaluation of the Massachusetts Firm-Yield Estimator Model Version 2.0: *U.S. Geological Survey Scientific Investigations Report 2011-5125*, 49 p., plus CD-ROM.

Weiskel, P.K., S.L. Brandt, L.A. DeSimone, L.J. Ostiguy, and **S.A. Archfield**, 2010, Indicators of streamflow alteration, habitat fragmentation, impervious cover, and water quality for Massachusetts stream basins: *U.S. Geological Survey Scientific Investigations Report 2009-5272*, 70 p., plus CD-ROM.

Archfield, S.A., R.M. Vogel, P.A. Steeves, S.B. Brandt, P.K. Weiskel, and S.P. Garabedian, 2010, The Massachusetts Sustainable-Yield Estimator: A decision-support tool to assess water availability at ungaged sites in Massachusetts, *U.S. Geological Survey Scientific Investigations Report 2009-5227*, 41 p., plus CD-ROM.

Archfield, S.A., 2009, Estimation of continuous daily streamflow at ungaged locations in southern New England, Tufts University, Medford, MA, *Ph.D. dissertation*.

Archfield, S.A. and R.M. Vogel, 2009, The implications of discretizing continuous random variables: An example using the U.S. Geological Survey reporting standards for streamflow data, *Proceedings of the American Society of Civil Engineers World Environmental and Water Resources Congress*, Kansas City, Missouri, May 2009.

Carlson, C.S. and **S.A. Archfield**, 2008, Hydrogeologic conditions and a firm-yield assessment for J.B. Converse Lake, Mobile County, Alabama, 1991-2006: *U.S. Geological Survey Scientific Investigations Report 2008-5005*.

Archfield, S.A., R.M. Vogel, and S.B. Brandt, 2007, Estimation of flow-duration curves at ungaged sites in southern New England, *Proceedings of the American Society of Civil Engineers World Water and Environmental Resources Congress*, Tampa, FL, 2007.

Archfield, S.A. and C.S. Carlson, 2006, Ground-Water Contributions to Reservoir Storage and the Effect on Estimates of Firm Yield for Reservoirs in Massachusetts: *U.S. Geological Survey Scientific Investigations Report 2006-5045*.

Waldron, M.C., and **S.A. Archfield**, 2006, Factors Affecting Firm Yield and the Estimation of Firm Yield for 47 Streamflow-Dominated Drinking-Water-Supply Reservoirs in Massachusetts: *U.S. Geological Survey Scientific Investigations Report 2006-5044*.

Archfield, S.A., and D.L. LeBlanc, 2005, Comparison of Diffusion- and Pumped-Sampling Methods to Monitor Volatile Organic Compounds in Ground Water, Massachusetts Military Reservation, Cape Cod, Massachusetts, July 1999-December 2002: *U.S. Geological Survey Scientific Investigations Report 2005-5010*.

Archfield, S.A. and R.M. Vogel, 2005, Reliability of reservoir firm yield determined from the historical drought of record, *Proceedings of the American Society of Civil Engineers World Water and Environmental Resources Congress*, Anchorage, Alaska, 2005.

Bent, G.C., and **S.A. Archfield**, 2002, A Logistic Regression Equation for Estimating the Probability of a Stream Flowing Perennially in Massachusetts: *U.S. Geological Survey Water-Resources Investigations*

Report 02-4043, 45 p.

Archfield, S.A., 2001, Exploring mechanisms for the decrease of atmospheric carbon dioxide during the last glacial maximum using a four-box ocean model, Massachusetts Institute of Technology, Cambridge, MA, *M.S. thesis*.

FUNDING

[* lead proposal author; + lead investigator; ; ~ proposal co-author; # co-investigator]

National comparison of models to estimate streamflow at ungaged basins, (*Project duration: 2011-2013; Budget: \$500,000; Funding provided by U.S. Geological Survey National Water Census Initiative*)*#

National network gap analysis of U.S. Geological Survey streamgages (*Project duration: 2011-2012; Budget: \$125,000; Funding provided by U.S. Fish and Wildlife Service*)#

An updated hydroclassification of streamflows at minimally-altered streamgages for the conterminous United States (*Project duration: 2010-2012; Budget: \$250,000; Funding provided by USGS National Water-Quality Assessment Program and U.S. Geological Survey National Water Census Initiative*)+

Prediction intervals for estimated water-quality concentrations and fluxes with serially-correlated residuals (*Project duration: 2010-2012; Budget: \$75,000; Funding provided by USGS National Water-Quality Assessment Program*)#

Water use for irrigation—A Pilot Study for Improving Irrigation Water Use Estimates for the USGS National Water-Use Information Program (*Project duration: 2010-2013; Budget: \$620,000; Funding provided by U.S. Geological Survey National Water Census Initiative*)~

An interactive, GIS-based application to estimate continuous, unimpacted daily streamflow at ungaged locations in the Connecticut River Basin (*Project duration: 2008-2011; Budget: \$96,000; Funding provided by the New England Association of Fish and Wildlife Agencies and The Nature Conservancy*)*+

Refinement and further evaluation of the Massachusetts Firm-Yield-Estimator model version 2.0 (*Project duration: 2007-2011; Budget: \$650,000; Funding provided by the U.S. Geological Survey Cooperative Water Program and the Massachusetts Department of Environmental Protection*)*+

COMMITTEE MEMBERSHIPS

Member, U.S. Geological Survey National Water Census Ad Hoc Advisory Committee, Reston, VA, August 2010-Present. *The Ad Hoc Advisory Committee is a group of national stakeholder organizations that provide input on the priorities for the U.S. Geological Survey National Water Census Initiative.*

Member, Pennsylvania Instream Flow Committee, 2009-Present

Member, Surface-Water Hydrology Committee, Environmental and Water Resources Institute, American Society of Civil Engineers, 2008-Present

Member, U.S. Geological Survey Peer Panel Review Process for Research Grade Evaluations in the Surface Water and Geomorphology Disciplines, Denver, CO, March 2010 (*Panel to review U.S. Geological Survey researchers for promotion*).

Member, Human Water Use Work Group, U.S. Geological Survey National Water Census Implementation Plan, September 2009-January 2010.

Member, Ecological Water Use Work Group, U.S. Geological Survey National Water Census Implementation Plan, September 2009-January 2010.

SCIENTIFIC LEADERSHIP AND SERVICE

Ongoing reviewer for the journals Water Resources Research, Journal of Hydrologic Engineering, Hydrology and Earth Systems Sciences, Water Research, Environmental Modeling & Software and Journal of Environmental Quality

Convener and chair, Session titled “Hydrologic Similarity at the Catchment Scale”, *European Geosciences Union 2011 General Assembly*, Vienna, Austria, April 2011. (*I was asked to re-convene this session for the 2012 General Assembly based on the success of this session.*)

Session Moderator, 2011, “Stats and Hydrologic Data—Network Analysis, Instrument Comparisons and Uncertainty,” *2011 U.S. Geological Survey National Surface Water Conference and Hydroacoustics Workshop*, Tampa, FL, March 2011.

Panel member for session titled, “StreamStats Panel Discussion,” *2011 National Surface Water Conference and Hydroacoustics Workshop*, Tampa, FL, March 2011.

Panel member for session titled, “Networking for a career in public service”, *Tufts University symposium on Preparing for a Career in Public Service*, Medford, MA, October 2010.

Reviewer, Environmental Protection Agency technical guide titled, “Identifying and protecting healthy watersheds: A technical guide”, 2009.

Co-organizer, Special Session on Stochastic and Probabilistic Methods for Water Resources Planning and Management, *2010 World Environmental and Water Resources Congress*, Providence, RI, May 2010.

Session Moderator, Generation/Forecasting of Hydrologic Time Series, *2009 World Environmental and Water Resources Congress*, Kansas City, Missouri, May 2009.

Co-organizer, Special Session on Stochastic and Probabilistic Methods for Water Resources Planning and Management, *2009 World Environmental and Water Resources Congress*, Kansas City, Missouri, May 2009.

Panel member for session titled “Approaches for Building a Hydrologic Foundation for Regional Analysis of Flow-Ecology Relations,” *Joint meeting of the U.S. Geological Survey and The Nature Conservancy, Regional-Scale Streamflow-Ecology Relationships*, Seattle, WA, April 2008.

SOFTWARE DEVELOPED

The Connecticut River Unimpacted Flow tool: A GIS-based tool to estimate daily streamflow at ungaged locations in the Connecticut River Basin, *currently in beta testing*.

The Massachusetts Sustainable-Yield Estimator: A decision-support tool to assess water availability at ungaged stream locations in Massachusetts, *available for download at:*
http://ma.water.usgs.gov/sarch/software/sye_mainpage.htm.

Bioperiods Flow Calculator: A tool to determine streamflow statistics for user-specified bioperiods, *provided to Connecticut Department of Environmental Protection and The Nature Conservancy*.

Pond Calculator: An automated tool to determine pond stratification, *provided to staff at the National Park Service Cape Cod National Seashore*.

ABSTRACTS AND PRESENTATIONS

[* international meeting]

Archfield, S.A. and J.E. Kiang, 2011, “Response of the United States streamgauge network to high- and low-flow periods, *American Geophysical Union 2011 Fall Meeting*, San Francisco, CA, December 2011.

***Archfield, S.A.**, A. Castellarin, J.O. Skøien, J.E. Kiang, 2011, “Coupling topological and canonical kriging for design-flood prediction in ungauged basins in the southeastern United States,” *European Geosciences Union Leonardo Conference Series on the Hydrological Cycle Floods in 3D: Processes, Patterns, Predictions*, Bratislava, Slovakia, November 2011.

Archfield, S.A. and P.A. Steeves, 2011, “An interactive, GIS-based application to estimate continuous, unimpacted daily streamflow at ungaged locations in the Connecticut River Basin,” *U.S. Geological Survey National Map User’s Conference*, Denver, CO, May 2011.

***Archfield, S.A.**, R. Singh, T. Wagener, and R.M. Vogel, 2011, “Estimation of daily streamflow time series at ungauged basins using the map correlation method,” *European Geosciences Union 2010 General Assembly*, Vienna, Austria, April 2011.

- Archfield, S.A.**, D. Wolock, D. Calisle, J. Kennen, K. Eng, and J. Kiang, 2011, "An updated hydroclassification of streamflows at minimally-altered streamgages for the conterminous United States," *2011 U.S. Geological Survey National Surface Water Conference and Hydroacoustics Workshop*, Tampa, FL, March 2011.
- Archfield, S.A.**, 2011, "Estimation of daily streamflow time series at ungaged basins using the map correlation method," *2011 U.S. Geological Survey National Surface Water Conference and Hydroacoustics Workshop*, Tampa, FL, March 2011.
- Wolock, D., **S.A. Archfield**, D. Calisle, J. Kennen, K. Eng, and J. Kiang, 2010, "An updated hydroclassification of streamflows at minimally-altered streamgages for the conterminous United States," *American Geophysical Union 2010 Fall Meeting*, San Francisco, CA, December 2010.
- Archfield, S.A.**, R.M. Hirsch, and R.M. Vogel, 2010, "Prediction intervals for estimated water-quality concentrations and fluxes with serially-correlated residuals," *American Geophysical Union 2010 Fall Meeting*, San Francisco, CA, December 2010.
- ***Archfield, S.A.**, R.M. Vogel, T. Waneger, and R. Singh, 2010, "Rainfall-runoff model calibration at an ungauged catchment using the map-correlation method," *European Geosciences Union 2010 General Assembly*, Vienna, Austria, May 2010.
- *Gao, Y., **S.A. Archfield**, and R.M. Vogel, 2009, Estimation of Daily Streamflow Series at Ungaged Sites in the Semi-arid Volta Basin of West Africa. *European Geosciences Union 2009 General Assembly*, Vienna, Austria, April 2009.
- Archfield, S.A.**, R.M. Vogel, P.A. Steeves, S.B. Brandt, P.K. Weiskel, and S.P. Garabedian, 2009, "A decision-support tool to assess water availability at ungaged sites in Massachusetts," *Geological Society of America 44th Annual Northeastern Section Meeting*, Portland, Maine, April 2009.
- Archfield, S.A.**, and P.A., Steeves, 2008, "A Desktop Application to Assess Sustainable Basin Yields and Surface-Water Resources in Massachusetts," *Association of American Geographers Annual Meeting*, Boston, Massachusetts, April 2008.
- Massey, A. J., L.J. Ostiguy, and **S.A. Archfield**, 2008, "Bathymetric Surveying: Determination of the minimum number of water-depth measurements needed to characterize reservoir storage," *Association of American Geographers Annual Meeting*, Boston, Massachusetts, April 2008.
- Steeves, P.A., and **S.A. Archfield**, 2008, "A Desktop Application to Assess Sustainable Basin Yields and Surface-Water Resources in Massachusetts," *American Water Resources Association Spring Specialty Conference on GIS and Water Resources*, San Mateo, CA, March 2008.
- Allaire, M. and **S.A. Archfield**, 2007, "USGS Firm-Yield Estimator Model: Evaluating the influence of small reservoirs on ground-water recharge," *Geological Society of America Annual Meeting*, Denver, CO, October 2007.
- Archfield, S.A.**, R.M. Vogel, and S.B. Brandt, 2007, "Estimation of continuous daily streamflow at ungaged sites in southern New England," *Massachusetts Water Resources Center Fifth Annual Water Resources Conference*, Amherst, MA, April 2007.
- Archfield, S.A.**, 2006, "The effect of ground water on estimates of reservoir firm yield," *American Geophysical Union Joint Assembly*, Baltimore, MD, April 2006.

PROFESSIONAL MEMBERSHIPS

American Geophysical Union (AGU)
 European Geosciences Union (EGU)
 Environmental and Water Resources Institute, American Society of Civil Engineers (EWRI)